

the carcass ply ends.

One approach is to clamp the carcass plies to the bead core. For example, U.S. Pat. No. 4,922,985, ('985) discloses a carcass ply having a main portion that extends between both bead cores of the tire and turnup portions that are anchored around each 5 bead core by a clamping member. According to '985, the clamping member comprises a strip of side-by-side cords of a heat shrinkable material embedded in a suitable elastomeric substance having a permanent thermal shrinkage of at least 2 percent.

Another approach, as disclosed by U.S. Patent 4,185,676, ('676) is to extend the portions of the carcass reinforcement that have been turned upward around the bead rings 10 toward the outside of the tire and embed them in an annular portion of the tire that protrudes from the outer lower portion of the corresponding sidewall. According to '676, a mechanical de-coupling is obtained between the elastic matrices surrounding the carcass reinforcement and its upward turned portions, thus eliminating shearing in these zones.

It is continually the goal in the art to simplify the construction and reduce the 15 expense of building locked-bead type tires, yet improve the durability, handling, rolling resistance and other properties of the tires.

## OBJECTS OF THE INVENTION

It is an aspect of the present invention to provide a more efficient tire bead manufacturing process as defined in one or more of the appended claims and as such, 20 having the capability of accomplishing one or more of the following subsidiary objects.

An aspect of the present invention is to improve bead durability by eliminating stresses at ply ending.

Another aspect of the present invention is to minimize the shear stresses at the chafer/ply interface in the bead area by eliminating the ply turn-up around the bead.

25 Yet another aspect of the present invention is to maximize sidewall flexibility in the vicinity of the rim flange to increase the tire load capacity and improve rim-bead seating.

Other aspects and advantages of this invention will become readily apparent as the 30 invention is better understood by reference to the accompanying drawings and the detailed description that follows.

## SUMMARY OF THE INVENTION

The present invention relates to a pneumatic tire, specifically to the carcass ply turnup structure in the bead region and more specifically to a locked bead type of